Claims.

What is claimed is:

1. A composition for the detection of Epstein-Barr virus, comprising at least one purified and isolated oligonucleotide consisting of a nucleic acid sequence which complements and specifically hybridizes to an Epstein-Barr virus nucleic acid molecule, wherein the sequence is at least 80% homologous to a sequence selected from the group consisting of SEQ. ID. NO. 1, SEQ ID NO. 2, SEQ. ID. NO. 5, and SEQ.ID. NO. 6.

2. A composition for the detection of Epstein-Barr virus, comprising at least one purified and isolated oligonucleotide consisting of a nucleic acid sequence which complements and specifically hybridizes to an Epstein-Barr virus nucleic acid molecule, wherein the sequence is selected from the group consisting of SEQ. ID. NO. 1, SEQ ID NO. 2, SEQ. ID. NO. 5, SEQ.ID. NO. 6, and a nucleotide sequence which differs from SEQ. ID. NO. 1, SEQ ID NO. 2, SEQ. ID. NO. 5, or SEQ.ID. NO. 6 by a one base change or substitution therein.

3. An isolated and purified oligonucleotide primer pair for enzymatic amplification of Epstein-Barr virus DNA, comprising a pair of nucleic acid sequences which complement and specifically hybridize to an Epstein-Barr virus nucleic acid molecule, wherein the pair of nucleic acid sequences is at least 95% homologous to sequences selected from the group consisting of (a) the oligonucleotide pair of SEQ. ID. NO. 1 and SEQ ID NO. 2 and (b) the oligonucleotide pair of SEQ. ID. NO. 5 and SEQ.ID. NO. 6.

4. An isolated and purified oligonucleotide primer pair for enzymatic amplification of Epstein-Barr virus DNA, comprising a pair of nucleic acid sequences which complement and specifically hybridize to an Epstein-Barr virus nucleic acid molecule, wherein the pair of nucleic acid sequences is selected from the group consisting of (a) the oligonucleotide pair of SEQ. ID. NO. 1 and SEQ ID NO. 2, (b) the oligonucleotide pair of SEQ. ID. NO. 5 and SEQ.ID. NO. 6, (c) a

nucleotide pair which differs from SEQ. ID. NO. 1 and SEQ ID NO. 2 by a one base change or substitution therein, and (d) a nucleotide pair which differs from SEQ. ID. NO. 5 and SEQ ID NO. 6 by a one base change or substitution therein.

5. An isolated and purified oligonucleotide primer pair for enzymatic amplification of Epstein-Barr virus DNA, consisting essentially of a pair of nucleic acid sequences which complement and specifically hybridize to an Epstein-Barr virus nucleic acid molecule, wherein the pair of nucleic acid sequences is selected from the group consisting of (a) the oligonucleotide pair of SEQ. ID. NO. 1 and SEQ ID NO. 2 and (b) the oligonucleotide pair of SEQ. ID. NO. 5 and SEQ.ID. NO. 6.

6. A method of detecting the presence of Epstein Barr virus DNA in a sample comprising: a) contacting the sample with a hybridization probe comprising one or more oligonucleotides selected from the group consisting of SEQ. ID. NO. 3, SEQ. ID. NO. 4, SEQ. ID. NO. 7 and SEQ. ID. NO.8, labeled with a detectable moiety, under suitable conditions permitting hybridization of the labeled oligonucleotide probe to the Epstein-Barr virus DNA, and b) detecting the presence of the probe bound to the DNA sequences by detecting the detectable moiety of the labeled oligonucleotide probe hybridized to the Epstein Barr virus DNA sequences.

7. A method of detecting the presence of Epstein Barr virus DNA in a sample comprising: a) contacting the sample with an oligonucleotide primer selected from the group consisting of SEQ. ID. NO. 1, SEQ ID NO. 2, SEQ. ID. NO. 5, SEQ.ID. NO. 6, under suitable conditions permitting hybridization of the oligonucleotides to the Epstein Barr virus DNA, b) enzymatically amplifying a region of the Epstein Barr virus DNA using the oligonucleotide primer sequence selected from the group consisting of SEQ. ID. NO. 1, SEQ ID NO. 2, SEQ. ID. NO. 5, SEQ.ID. NO. 6, to form amplified Epstein Barr virus DNA sequences, c) contacting the amplified Epstein Barr virus DNA sequences from step (b), if present, with a hybridization probe comprising one or more oligonucleotides selected from the group consisting of SEQ. ID. NO. 3, SEQ. ID. NO. 4, SEQ. ID. NO. 7 and SEQ.

ID. NO.8, labeled with a detectable moiety under suitable conditions permitting hybridization of the labeled oligonucleotide probe to the amplified Epstein Barr virus DNA sequences, and d) detecting the presence of the amplified Epstein Barr virus DNA sequences by detecting the detectable moiety of the labeled oligonucleotide probe hybridized to the amplified Epstein Barr virus DNA sequences.

8. A method of detecting the presence of Epstein Barr virus DNA in a sample comprising: a) contacting the sample with oligonucleotide primer pair of SEQ. ID. NO. 1 and SEQ ID NO. 2 or the oligonucleotide pair of SEQ. ID. NO. 5 and SEQ.ID. NO. 6, under suitable conditions permitting hybridization of the oligonucleotides to the Epstein Barr virus DNA, b) enzymatically amplifying a region of the Epstein Barr virus DNA using the oligonucleotide pair of SEQ. ID. NO. 1 and SEQ ID NO. 2 or the oligonucleotide pair of SEQ. ID. NO. 5 and SEQ.ID. NO. 6 to form amplified Epstein Barr virus DNA sequences, c) contacting the amplified Epstein Barr virus DNA sequences from step (b), if present, with a hybridization probe comprising one or more oligonucleotides selected from the group consisting of SEQ. ID. NO. 3, SEQ. ID. NO. 4, SEQ. ID. NO. 7 and SEQ. ID. NO.8, labeled with a detectable moiety under suitable conditions permitting hybridization of the labeled oligonucleotide probe to the amplified Epstein Barr virus DNA sequences, and d) detecting the presence of the amplified Epstein Barr virus DNA sequences by detecting the detectable moiety of the labeled oligonucleotide probe hybridized to the amplified Epstein Barr virus DNA sequences.

9. A method of detecting the presence of Epstein Barr virus DNA in a sample comprising: a) contacting the sample with oligonucleotide primer pair of SEQ. ID. NO. 1 and SEQ ID NO. 2 or the oligonucleotide pair of SEQ. ID. NO. 5 and SEQ.ID. NO. 6, under suitable conditions permitting hybridization of the oligonucleotides to the Epstein Barr virus DNA, b) enzymatically amplifying a region of the Epstein Barr virus DNA using the oligonucleotide pair of SEQ. ID.

NO. 1 and SEQ ID NO. 2 or the oligonucleotide pair of SEQ. ID. NO. 5 and SEQ.ID. NO. 6 to form nucleic acid amplification products, c) contacting the amplified Epstein Barr virus DNA sequences from step (b), if present, with hybridization probes comprising the oligonucleotide pair of SEQ. ID. NO. 3 and SEQ. ID. NO. 4 or the oligonucleotide pair of SEQ. ID. NO. 7 and SEQ. ID. NO.8, labeled with a detectable moiety under suitable conditions permitting hybridization of the labeled oligonucleotide probe to amplified Epstein Barr virus DNA sequences, and d) detecting the presence of amplified Epstein Barr virus DNA sequences by detecting the detectable moiety of the labeled oligonucleotide probe hybridized to the amplified Epstein Barr virus DNA sequences.

10. The method of claim 9, wherein the sample is treated to release nucleic acid molecules from cells in the sample prior to step (a).

11. The method of claim 9, wherein the presence of the amplified Epstein Barr virus DNA sequences hybridized to labeled oligonucleotide probe correlates to the presence of Epstein Barr virus in the sample.

12. The method of claim 11, wherein the amplified DNA sequences are from the EBNA2 region of the Epstein Barr virus genome.

13. The method of claim 11, additionally comprising adding an internal standard for accessing relative amounts of Epstein Barr virus after amplification.

14. The method of claim 11, wherein presence of the amplified Epstein Barr virus DNA sequences hybridized to labeled oligonucleotide probe is correlated to the presence of Epstein Barr virus in the sample by comparing the amount of amplification product to the quantity of amplification products formed from known internal standards.

15. The method of claim 11, wherein the primers comprise the oligonucleotide pair of SEQ. ID. NO. 1 and SEQ. ID. NO. 2.

16. The method of claim 15, wherein the hybridization probes comprise SEQ. ID. NO. 3 and SEQ. ID. NO. 4.

17. The method of claim 11, wherein the primers comprise the oligonucleotide pair of SEQ. ID. NO. 5 and SEQ. ID. NO. 6.

18. The method of claim 17, wherein the hybridization probes comprise SEQ. ID. NO. 7 and SEQ. ID. NO. 8.

19. The method of claim 11, wherein the amplification is performed by cyclic polymerase-mediated reaction.

20. The method of claim 19, wherein the cyclic polymerase-mediated reaction is an enzymatic assay selected from the group consisting of PCR, LCR, SDA, QßRA, 3SR, and NASBA.

21. The method of claim 20, wherein the polymerase is selected from the group consisting of thermostable polymerase, E. coli DNA pol I, Klenow fragment, and T7 DNA polymerase.

22. The method of claim 21, wherein the PCR is a thermocyclic reaction.

23. The method of claim 11, wherein the detectable moiety is selected from the group consisting of a digoxigenin-dUTP, biotin, calorimetric, fluorescent, chemiluminescent, electrochemiluminescent signal and a radioactive component.

24. The method of claim 11, wherein the detectable moiety is a fluorescent component generating a fluorescent signal.

25. The method of claim 21, wherein the amount of amplification product is determined simultaneously with respect to the PCR amplification step.

26. A method of selecting an appropriate dosage or type of antiviral agent for treating an infection caused by Epstein Barr virus comprising the steps of: a) obtaining a sample from a patient to be treated; b) preparing the sample for PCR amplification; c) adding PCR reagents to the prepared sample, including at least

one primer pair selected from the group consisting of the oligonucleotide pair SEQ. ID. NO. 1 and SEQ ID NO. 2, the oligonucleotide pair of SEQ. ID. NO. 5 and SEQ.ID. NO. 6, and complementary sequences thereof; d) maintaining the prepared sample of step c under conditions suitable for amplification; e) adding at least one probe labeled with a detectable moiety corresponding to the primer pair, selected from the group consisting of the oligonucleotide pair of SEQ. ID. NO. 3 and SEQ. ID. NO. 4, the oligonucleotide pair of SEQ. ID. NO. 7 and SEQ. ID. NO.8, and complementary sequences thereof, under suitable conditions permitting hybridization; f) measuring quantitatively one or more of the Epstein Barr virus species contained in the sample; and vii) selecting the type or adjusting the dosage of the antiviral agent based on the quantitative measurement.

27. The method of claim 26 additionally comprising adding to step c) an internal standard for accessing relative amounts of Epstein Barr virus after amplification.

28. The method of claim 27, wherein the PCR reagents comprise a polymerase selected from the group consisting of thermostable polymerase, E. coli DNA pol I, Klenow fragment, and T7 DNA polymerase.

29. The method of claim 28, wherein the detectable moiety is selected from the group consisting of a digoxigenin-dUTP, biotin, calorimetric, fluorescent, chemiluminescent, electrochemiluminescent signal and a radioactive component.

30. The method of claim 20, further comprising a separation step wherein the amplified product is isolated.

31. A method for the simultaneous amplification and detection of Epstein Barr Virus DNA in a sample comprising: a) processing the sample to produce denatured opposing strands of DNA; b) simultaneously subjecting the denatured opposing strands of DNA to polymerase chain reaction in the presence of i) an aqueous solution buffered to a pH of about 6 to about 9 and ii) first and second primers which are specific to and hybridizable with the denatured opposing strands of DNA, wherein the sequences of the first and second primers are selected from the

group consisting of SEQ. ID. NO. 1 with SEQ. ID. NO. 2, and SEQ. ID. NO. 5 with SEQ. ID. NO. 6; and c) simultaneously detecting the amplified DNA using hybridization probes comprising the oligonucleotide pair of SEQ. ID. NO. 3 and SEQ. ID. NO. 4 or the oligonucleotide pair of SEQ. ID. NO. 7 and SEQ. ID. NO.8.

32. The method of claim 31 wherein the hybridization probe further comprises a detectable moiety selected from the group consisting of a chemiluminescent component, a fluorescent component, and a radioactive component.

33. A diagnostic test kit for detection of Epstein Barr virus comprising: (a) at least one oligonucleotide primer pair selected from the group consisting of the oligonucleotide pair of SEQ. ID. NO. 1 and SEQ ID NO. 2, the oligonucleotide pair of SEQ. ID. NO. 5 and SEQ. ID. NO. 6, and both the oligonucleotide pair of SEQ. ID. NO. 1 and SEQ ID NO. 2 and the oligonucleotide pair of SEQ. ID. NO. 5 and SEQ. ID. NO. 6; and (b) at least one oligonucleotide probe labeled with a detectable moiety selected from the group consisting SEQ. ID. NO. 3, SEQ. ID. NO. 4, SEQ. ID. NO. 7 and SEQ. ID. NO. 8.

34. The diagnostic test kit of claim 33, further comprising at least one additional reagent selected from the group consisting of a lysing buffer for lysing cells contained in the specimen; enzyme amplification reaction components dNTPs, reaction buffer, and amplifying enzyme; and a combination thereof.

35. The diagnostic kit of claim 34, wherein the primers comprise the oligonucleotide pair of SEQ. ID. NO. 1 and SEQ. ID. NO. 2.

36. The diagnostic kit of claim 35, wherein the hybridization probes comprise SEQ. ID. NO. 3 and SEQ. ID. NO. 4.

37. The diagnostic kit of claim 34, wherein the primers comprise the oligonucleotide pair of SEQ. ID. NO. 5 and SEQ. ID. NO. 6.

38. The diagnostic kit of claim 37, wherein the hybridization probes comprise SEQ. ID. NO. 7 and SEQ. ID. NO. 8.

39. The diagnostic kit of claim 33, wherein the hybridization probe further comprises a detectable moiety selected from the group consisting of a chemiluminescent component, a fluorescent component, and a radioactive component.